Table 1: Transportation 2035 Quantitative Evaluation - Summary of Draft Results **May 28, 2008**

RTP ID#	Project Title	County	Invest Type [1]	Project Capital Cost ('07$M)	Total Annual Benefit ('07$M)	Annual VMT Reduced (mill) [2]	Annual CO_2 Reduced (tons) [2]	Cost Per VMT Reduced ('07$M) [2]	Cost Per Ton CO_2 reduced [2]	Benefit/ Cost [3]	Notes
B/C Ratio of 10 or higher											
21992, 230111	AC Transit Transit Priority Measures (TPM) and Corridor Improvements* *AC Transit submitted additional TPM components consisting of Grand/Maritime HOT on-ramp and Bay Bridge contraflow lane, which are not included in this assessment. Preliminary off-model analysis suggests these components have significant benefits for transit riders and merit further examination.	Alameda	NC/V	$38.3	$56.5	12.1	720	$0.2	$2,700	30	
230419	Freeway Performance Initiative	Bay Area Region/ Multi-County	NC	$600.0	$1,593.5	-66.2	202,000	-$0.8	$300	28	
Various	Santa Clara HOT Corridors: US 101, SR 87, SR 85, SR 237, I-880, I-280, I-680 (RTP ID#230248, 230404, 230254, 230259, 230258, 230278, 230280, 230264, 230263, 230256, 230257, 230270, 230272, 230281, 230275, 230260, 230276)	Santa Clara	NC	$777.9	$1,030.9	310.7	246,000	$0.1	$200	25	
230369, 230610	Regional HOT Network and express bus enhancement	Multi-County	NC	$3,281.6	$3,795.9	781.5	610,000	$0.3	$300	18	
22420	Bus Rapid Transit (BRT)/Transit Preferential Streets (TPS) (sales tax project)	San Francisco	NC	$418.2	$350.5	50.2	4,500	$0.4	$4,650	17	
22776	Route 84 Expressway Widening	Alameda	NC	$124.0	$90.8	5.9	13,000	$1.2	$500	13	
230161	Van Ness Avenue BRT	San Francisco	NC	$76.1	$39.6	7.2	200	$0.5	$19,000	10	
B/C Ratio of 5 to 9											
22657	I-580 (Altamont Pass) Westbound Truck Climbing Lane	Alameda	V	$75.6	$31.8	-0.5	-4,900	-$7.6	-$800	8	
21902, 230413, 98154, 98147*	US 101 SB HOV lane extension (Railroad/ Pepper to Petaluma River Bridge) and Marin-Sonoma Narrows (SB: Petaluma River Bridge to Rowland; NB: north of Atherton Avenue to north of East Washington Ave)	Multi-County/ Bay Area Region	NC	$926.8	$378.7	-36.6	-2,090	-$1.3	-$24,000	8	
Various	Alameda HOT Corridors: I-680, I-580, I-880, I-238 (RTP ID#230088, 230089, 230609, 22042, 22668, 22664, 230241)	Alameda	NC	$1,550.9	$663.4	188.6	130,000	$0.5	$700	7	
230164	Geary Boulevard BRT	San Francisco	NC	$190.5	$64.2	6.9	200	$1.4	$47,600	7	
22700	Parallel corridor north of I-80 from Red Top Road to Abernathy Road (the western section extends from the railroad crossing on Red Top Road	Solano	NC	$68.0	$25.3	7.7	5,000	$0.5	$800	6	
22351*	I-680 NB HOV lane extensions (North Main to SR-242 and north of Benicia Bridge to I-80) and HOV lane connector NB I-680 to EB I-80	Multi-County	V	$193.0	$74.3	-18.3	2,800	-$0.7	$4,400	6	
21902, 230413*	US 101 SB HOV lane extension (Railroad/ Pepper to Petaluma River Bridge)	Sonoma	NC	$124.0	$36.6	-4.2	-7,140	-$1.7	-$980	5	
22145, 22958	SR 237/US 101 improvements: a) Widen westbound Route 237 on-ramp to northbound US 101 to 2 lanes and add auxiliary lane on northbound US 101 from Route 237 on-ramp to… b) US 101 southbound to eastbound Route 237 connector improvements	Santa Clara	NC/V	$73.0	$20.3	-0.1	3,900	-$47.6	$1,000	5	
22013	Eastbound I-580 Truck Climbing Lane	Alameda	NC	$64.2	$17.6	-0.5	-3,300	-$7.4	-$1,000	5	
230569*	I-80 EB & WB HOV lanes between Airbase Parkway and I-505	Solano	NC	$132.0	$45.8	-22.9	-1,000	-$0.4	-$10,000	5	
Various	Local Streets and Roadway Maintenance Shortfall	Regional	NC	$8,208.0	$1,573.0	N/A	N/A	N/A	N/A	5	B/C based on dollars saved by performing maintenance on time. Average annual benefit for high funding scenario
94151	Construct 4-lane Jepson Parkway from Route 12 to Leisure Town Road	Solano	NC	$182.0	$46.6	-2.0	15,000	-$5.1	$700	5	

Table 1: Transportation 2035 Quantitative Evaluation - Summary of Draft Results **May 28, 2008**

RTP ID#	Project Title	County	Invest Type [1]	Project Capital Cost ('07$M)	Total Annual Benefit ('07$M)	Annual VMT Reduced (mill) [2]	Annual CO_2 Reduced (tons) [2]	Cost Per VMT Reduced ('07$M) [2]	Cost Per Ton CO_2 reduced [2]	Benefit/ Cost [3]	Notes
B/C Ratio of 1 to 4											
22667	BART to Livermore: Tri-Valley rail extension from Dublin/Pleasanton BART Station to Greenville Road in the I-580 median	Alameda	NC	$1,042.0	$187.7	6.6	1,000	$6.8	$44,600	4	
230477	SR 12 Improvements: Phase 1	Solano	NC	$100.0	$21.4	-13.8	-4,700	-$0.4	-$1,300	4	
230060	Marin County Local Transit Enhancement on 6 Key Corridors	Marin	NC	$27.3	$6.9	1.9	200	$1.0	$9,750	4	
230326, 230327	I-80/I-680/SR12 Interchange: Phase 1 plus Balance of Project	Solano	V	$1,183.0	$209.9	-7.2	-2,200	-$8.7	-$28,000	3	
22346	Express bus service expansion along I-580 corridor	Contra Costa	V	$50.0	$9.0	0.4	30	$7.4	$108,000	3	
230326	I-80/I-680/SR12 Interchange - Phase 1	Solano	NC	$513.0	$67.2	1.3	-2,100	$21.4	-$13,000	2	
230570*	I-80 EB & WB HOV lanes between Carquinez Bridge and SR-37	Solano	NC	$105.0	$14.3	-3.7	-620	-$1.7	-$10,000	2	
n/a	I-80 add 5th mixed-flow lane (EB: SR-12 East to Airbase Parkway and WB: West Texas to SR-12 East)	Solano	N/A	$69.8	$8.7	-0.8	-2,582	-$4.7	-$1,500	2	
21714	SR 25/Santa Teresa Boulevard/US 101 Interchange (includes US 101 widening between Monterey Road and SR 25 and connection to Santa Teresa Blvd)	Santa Clara	NC	$233.0	$26.0	7.2	7,500	$1.7	$1,600	2	Under review.
B/C Ratio of 1 to 4, cont.											
Various	Transit Capital Shortfall	Regional	NC	$11,199.0	$783.9	N/A	N/A	N/A	N/A	2	B/C based on dollars saved by performing maintenance on time. Average annual benefit for high funding scenario
21011	Transportation for Livable Communities + (TOD emphasis)	Regional	NC	$1,500.0	$129.4	164.7	94,000	$0.5	$800	2	B/C based pivots off estimated VMT reduction
94644	Route 92 westbound slow vehicle lane between Route 35 and I-280	San Mateo	NC	$82.0	$8.4	-0.3	3,800	-$12.8	$1,100	2	
21612	Improvement of Dumbarton Bridge access to US 101	San Mateo	NC	$317.0	$27.0	1.3	10,000	$11.9	$1,590	2	
230403	US 101 Widening to 6-lane Freeway: SR 25 to SR 129	Santa Clara	V	$170.0	$15.4	0.5	200	$17.9	$45,800	2	
230496	SR 12 Improvements: Phase 2	Solano	NC	$150.0	$15.0	-0.8	-4,000	-$11.0	-$2,300	2	
230271	I-80 Express Bus Service	Alameda	NC	$70.0	$12.6	2.0	100	$4.2	$81,800	2	
21030	I-580/US 101 interchange improvements and new freeway-to-freeway connector from northbound US 101 to eastbound I-580	Marin	V	$98.0	$7.4	0.4	2,000	$11.6	$2,500	2	
22516	Enhance Capitol Corridor regional rail service (West Contra Costa and Solano cou	Contra Costa	V	$70.0	$11.4	7.2	1,000	$1.0	$7,600	2	
22415	Expand historic streetcar service	San Francisco	NC	$8.2	$2.2	0.1	3	$13.0	$466,000	2	B/C is for E-line upgrade only. Does not reflect F-line extension
21205, 22350	I-680/Route 4 interchange (Phase 1, 2 and 3) and (Phases 4 and 5) and HOV flyover ramps	Contra Costa	NC/V	$320.2	$21.9	-7.9	-1,100	-$2.1	-$15,000	1	
22162	Route 237 westbound to Route 85 southbound connector ramp improvements	Santa Clara	NC	$37.0	$2.6	-1.3	-590	-$1.5	-$3,300	1	
94506	East-West Connector Project in North Fremont and Union City	Alameda	NC	$150.0	$8.7	-10.8	-300	-$0.8	-$27,000	1	
230287	Goods Movement Emissions Reduction Project	Regional	NC	$106.5	$8.1	N/A	2,200	N/A	$6,100	1	Benefit based on CO2 and particulate emissions.
22400	Construct Route 239 from Brentwood to Tracy Expressway	Contra Costa	V	$200.0	$11.2	-7.8	6,100	-$1.5	$1,900	1	
230099	I-580/I-680 Improvements (NB I-680 to WB I-580)	Alameda	NC	$392.5	$19.0	0.4	200	$52.3	$98,300	1	
230294	New SR 152 Alignment: SR 156 to US 101	Santa Clara	V	$350.0	$15.8	-2.0	18,000	-$9.5	$1,000	1	
22605, 98222, 230208	SR4 Bypass: a) Segments 1 & 2: widen from 4 to 6 lanes from Sand Creek to Balfour, and widen segment 3 to 4 lane; b) Segment 1: Route 160 freeway-to-freeway connectors to and from the north; and c) Widen from 4 to 6 lanes from Laurel Road to Sand Creek Road	Contra Costa	V/NC/V	$219.0	$10.4	-10.6	-2,500	-$1.2	-$5,100	1	
22343	Express bus service expansion along I-680 corridor, Phase 2	Contra Costa	V	$57.0	$5.5	1.2	80	$5.7	$85,100	1	
21613	Route 92 improvements from San Mateo Bridge to I-280, includes uphill passing lane from US 101 to I-280	San Mateo	NC	$186.2	$7.2	-9.1	-5,600	-$1.1	-$1,700	1	
230207	Geneva/Harney Bus Rapid Tansit	San Francisco	NC	$202.0	$9.0	1.2	30	$10.6	$422,000	1	
230252	Marin County Local Transit Expansion	Marin	NC	$56.0	$12.2	2.7	100	$6.7	$181,000	1	
22981	Widen Route 4 as continuous 4-lane arterial from Marsh Creek Road to San Joaquin County line	Contra Costa	V	$100.0	$3.3	0.1	1,700	$105.5	$3,400	1	

Table 1: Transportation 2035 Quantitative Evaluation - Summary of Draft Results **May 28, 2008**

RTP ID#	Project Title	County	Invest Type [1]	Project Capital Cost ('07$M)	Total Annual Benefit ('07$M)	Annual VMT Reduced (mill) [2]	Annual CO_2 Reduced (tons) [2]	Cost Per VMT Reduced ('07$M) [2]	Cost Per Ton CO_2 reduced [2]	Benefit/ Cost [3]	Notes
B/C Ratio of less than 1											
22247	Regional Bicycle Network	Regional	NC	$1,300.0	$34.8	59.2	33,800	$1.1	$1,900	0.5	
230550	Transportation Climate Action Plan	Regional	NC	$184.0	$13.0	N/A	271,200	N/A	$200	0.4	Benefit based only on CO2 reduction
230571	I-80 EB & WB HOV Lanes (SR 37 to Red Top Rd.)	Solano	NC	$107.0	$2.4	-3.7	-620	-$1.7	-$10,000	0	
22671	Construct direct HOV connection between southbound I-880 to westbound Route 84 (Dumbarton Bridge approach)	Alameda	NC	$125.0	$0.6	0.3	510	$19.6	$12,300	0	Project too small to capture meaningfully.
22423	Lifeline	Regional	NC	$1,600.0	$1.8	N/A	N/A	N/A	N/A	0.03	Benefit based only on reduced auto ownership costs
22352	I-680/Norris Canyon Road HOV direct ramps in San Ramon	Contra Costa	NC	$80.0	-$0.2	-0.2	200	-$21.4	$20,400	0	Project too small to capture meaningfully.
94050	Upgrade Route 4 to full freeway from I-80 to Cummings Skyway (Phase 2)	Contra Costa	V	$75.0	-$3.2	-25.2	-14,800	-$0.2	-$300	-1	Under review

Notes

[1] V = Proposed as Vision Investment; NC = Proposed as New Commitment Investment

[2] negative number indicates an increase in VMT or CO_2 emissions

[3] B/C is based on total benefit divided by annualized cost. Refer to the detailed worksheet for annualized cost.

Delay reduction/travel time saving is the single biggest component of benefit, as measured here. B/C can be understood as a cost effectiveness measure for delay reduction and time savings

* Project analyzed may differ slightly from project submitted, as per discussions with the CMAS under the Freeway Performance Initiative corridor studies

Table 2: Benefit-Cost Analysis of Regional Funding Programs, May 8, 2008
Summary of Draft Results

Program	Approximate B/C	Alternative Performance Metric	Notes
FREEWAY PERFORMANCE	**Most direct impact on delay and only program run through regional model**		
Freeway Performance Initiative	28		
MAINTENANCE	**While B/Cs are low to average, the actual dollar value of the public savings by performing maintenance on time is huge**		
Local Streets and Roads Capital Shortfall	5	Total savings = $9.5 B to $39 B (Depending on level of regional investment)	B/C ratio reflects avoided increases in deferred maintenance and rehabilitation costs as well as savings in private extra vehicle operating costs incurred by driving on poorly maintained roadways, divided by the 25-year regional investment in maintenance shortfalls. Other benefits that are not accounted for here include impact that varying states of repair have on air quality, congestion, goods movement, emergency services, transit efficiency, etc...
Transit Capital Shortfall	2	Total savings = $1.5 B to $16 B (Depending on level of regional investment)	Reflects 1) the public benefit of avoided increases in rehabilitation and maintenance costs, and 2) the private benefit for passengers of avoided delays due to increased reliability, if transit capital assets are replaced and rehabilitated in a timely manner. Reflects only a small portion of the benefits of transit capital maintenance; does not include other benefits of maintaining an operable transit system, such as increased ridership, reduced congestion, reduced emissions, and increased mobility.
FOCUSED GROWTH	**Programs support focused growth, which reduces delay and emissions, but do not have huge, direct delay reduction benefits proportional to cost**		
Regional Bike Network	0.5		Bridge links account for approx 50% of total cost and 14% of mileage.
TLC + (recommended shift to facilitate TOD)	2		Higher VMT reduction from realignment of program to facilitate TOD. But program at this scale is still marginal compared to Focused Growth scenario tested in the Vision.
TLC (current emphasis)	0.4		Modest VMT reduction associated with amenities that are currently funded through TLC
AFFORDABILITY	**Programs mainly affect amount of funding spent by low-income households on transportation**		
Lifeline	0.03		Benefits include reduction in auto-ownership costs only.
Means Based Fare Subsidy	1	Reduces transportation expenditures as share of total expenditures from 36% to 33% for households with annual income < $15,000	Benefits include reduction in transit fare expenditures only. This is essentially a direct transfer
EMISSIONS REDUCTION	**B/Cs are low - because delay not affected, programs are most cost-effective strategies for emission reduction. The cost per emissions reduced is an order of magnitude lower than for other programs.**		
Climate Change	0.4	$200 per ton CO2 reduced	Benefits reflect CO2 reductions only. Under other projects and programs, the cost per ton reduced is in the thousands or tens of thousands
Port Emissions/Truck Retrofit	1	$560 K per ton PM2.5 reduced	Benefits reflect CO2 and particulate emissions only. Under other projects and programs, the cost per ton reduced is in the millions or tens of millions

Table 2: Draft Benefits and Costs of Regional Funding Programs
May 8, 2008

	FOCUSED GROWTH			AFFORDABILITY		EMISSIONS REDUCTION	
COST (2007$)	**Bike Network**	**TLC (current emphasis)**	**TLC + (TOD emphasis)**	**Lifeline**	**Means Based Transit Discount**	**Climate Protection**	**Truck Emissions Reduction**
Total 25-Year Cost	**$1,300,000,000**	**$1,500,000,000**	**$1,500,000,000**	**$1,600,000,000**	**$1,125,000,000**	**$ 184,000,000**	**$ 106,500,000**
Lifecyle of investment - for capital projects	**20**	**20**	**20**	n/a	n/a	n/a	n/a
Years of funding - for operating programs	n/a	n/a	n/a	**25**	**25**	**5**	**8**
Annual cost in 2035	**$ 65,000,000**	**$ 75,000,000**	**$ 75,000,000**	**$ 64,000,000**	**$ 45,000,000**	**$ 36,800,000**	**$ 13,312,500**
BENEFITS - Year 2035 (unless noted)						**Average Annual Benefit 2010 - 2015**	**Average Annual Benefit 2010 - 2018**
Reduction in annual vehicle trips	**14,808,400**	n/a	n/a	n/a	n/a	n/a	n/a
Reduction in annual VMT (millions)	**59.2**	**49.3**	**164.7**	n/a	n/a	n/a	n/a
Reduction in annual total delay (VHD)	**546,500**	**454,600**	**1,519,500**	n/a	n/a	n/a	n/a
Reduction in annual CO2 emissions (tons)	**33,800**	**28,100**	**94,000**	n/a	n/a	**271,200**	**2,200**
Reduction in annual PM10 emissions (tons)	**31.9**	**26.5**	**88.6**	n/a	n/a	n/a	**2.0**
Reduction in annual PM2.5 emissions (tons)	**8.7**	**7.3**	**24.3**	n/a	n/a	n/a	**22.8**
Reduction in annual motor vehicle fatalities and injuries	**33**	**27**	**92**	n/a	n/a	n/a	n/a
VALUE of BENEFITS - Year 2035 (unless noted) in 2007$						**Average Annual Benefit 2010 - 2015**	**Average Annual Benefit 2010 - 2018**
Reduction in annual auto ownership costs (dollars)	n/a	n/a	**$ 51,057,200**	**$ 1,798,600**	**n/a**	n/a	n/a
Reduction in annual auto operating costs (dollars)	**$ 13,612,000**	**$ 11,323,000**	**$ 19,325,000**	n/a	**n/a**	n/a	n/a
Reduction in annual transit fare costs (dollars)	n/a	n/a	n/a	n/a	**$ 45,000,000**	n/a	n/a
Reduction in annual delay (VHD)	$ 10,706,000	**$ 8,906,000**	**$ 29,767,000**	n/a	n/a	n/a	n/a
Reduction in annual CO2 emissions	$ 2,366,000	**$ 1,969,000**	**$ 6,580,000**	n/a	n/a	**$ 13,035,000**	**$ 157,000**
Reduction in annual PM10 emissions	$ 676,000	**$ 562,000**	**$ 1,879,000**	n/a	n/a	n/a	**$ 42,000**
Reduction in annual PM2.5 emissions	$ 3,057,000	**$ 2,543,000**	**$ 8,500,000**	n/a	n/a	n/a	**$ 7,981,000**
Reduction in annual motor vehicle fatalities and injuries	$ 4,412,000	**$ 3,670,000**	**$ 12,267,000**	n/a	n/a	n/a	n/a
Total Benefit	**$ 34,829,000**	**$ 28,973,000**	**$ 129,375,200**	**$ 1,798,600**	**$ 45,000,000**	**$ 13,035,000**	**$ 8,180,000**
B/C Ratio (rounded, if rounds to 1 or higher)	**0.5**	**0.4**	**2**	**0.03**	**1**	**0.4**	**1**
Cost per milllion VMT Reduced	**$ 1,097,000**	**$ 1,522,000**	**$ 455,000**	n/a	n/a	n/a	n/a
Cost per Ton CO2 Reduced	**$ 1,900**	**$ 2,700**	**$ 800**	n/a	n/a	**$ 200**	**$ 6,100**
Cost per Ton PM10 Reduced	**$ 2,040,100**	**$ 2,829,700**	**$ 846,700**	n/a	n/a	n/a	**$ 6,713,800**
Cost per Ton PM2.5 Reduced	**$ 7,441,500**	**$ 10,321,700**	**$ 3,088,300**	n/a	n/a	n/a	**$ 583,800**